Remembering Our Rural Roots: A Usability Study

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Abstract: With antecedents extending to 1837, ‘Ele‘ele School, a public elementary school located on Kaua‘i, Hawai‘i is significant in history, culture, and heritage. Reflective of its long history, the school holds a diverse collection of archives that derives its value from its longevity and depth, giving evidence of both the school's evolution and Kaua‘i’s changing landscape. Informed by perspectives on digitizing, a historical website was created and was evaluated in three iterative rounds of remote moderated usability testing with nine participants living in Hawai‘i. The purpose of this usability study was to create and evaluate the ease-of-use of a historical website of ‘Ele‘ele School and the community in which it resides. Participants were asked to perform a series of tasks that were designed to allow for exploration through the site and to test potential problematic elements within the site. A mixed method approach was adopted to evaluate the effectiveness of the website and the perceived satisfaction of the participants. The intent was to increasingly improve the design of the website for a satisfying user experience. The results of this study suggest that effectiveness and satisfaction are strongly correlated, which is in line with those of previous studies.

Introduction

Reflective of its long history, ‘Ele‘ele School holds a diverse collection of archives that have accumulated throughout its existence. The collection includes scrapbooks, photographs, documents, awards, newspaper clippings, and yearbooks. The value of the archives derives from its longevity as it documents both the school’s own development and the general evolution of Kaua‘i’s landscape. While most of the photos, taken in the 1930s, focus on the hands-on agricultural program that typified vocational education and training courses during that era, they also document the growth of Kaua‘i as sugar plantations gave way to grocery stores and houses. In particular, they capture a community that has both shaped and has been shaped by economic, social, and cultural changes over time. Although the school has a public-interest obligation to preserve the collection, the challenges of developing and implementing a strategy requires time, labor, and funding—resources that many public schools are not able to secure.

Bearing these burdens in mind, the aim throughout this project has been to offer novel and adaptive methods of preserving and disseminating archival collections while ensuring

that technological and cost barriers to entry are minimal. The rapid proliferation of technology, particularly in the past two decades, has provided more cost efficient and effective methods of preserving, recreating, and providing access to archival collections. Through the adoption of technology to digitize and contextualize selected aspects of the archives, I hoped that this project will contribute to my community and my former school. Therefore, I created a historical website and evaluated it in an iterative design and testing process to identify design features that were causing task failures, identify design features that were working well, and identify ways to improve user satisfaction. The purpose of this usability study was to create and evaluate the ease-of-use of a website about the history of ʻEleʻele School and the community in which it resides.

Literature Review

As a low cost mechanism for enhancing access to archival collections, several lines of evidence suggest that utilizing web-based social networking platforms yield effective results. The ubiquity of Web 2.0 technologies (those that facilitate information sharing) "enable users to create professional-looking resources without much technological or temporal investment" (Terras, 2011, p. 688). Consequently, "users with a personal interest in a technology can collectively and collaboratively, in a distributed and largely undirected environment, provide useful public resources" (Brady, 2005, p. 225). Although such platforms do not guarantee the preservation of content, the mechanisms of sharing, posting, downloading, and linking records with other users online can support the endurance of digital archives (Arrigoni et al., 2017). Others have highlighted that the development of robust finding aids are critical to the usability of digital collections (Keneley, Potter, West, Cobbin & Chang, 2016).

A simple yet effective method of aiding the discovery of a record is to supplement it with metadata. Metadata, which means "data about data," contains descriptive information of a record that is inserted by the user or automatically generated by the platform (Shilling, 2018; Arrigoni et al., 2017). Researchers have suggested that adopting consistent processes for metadata attachment can serve more than the purpose of retrieving one's own images. It can also function as "a communication mechanism to connect to other streams of content related to the same or similar [subject], and to enable searches and aggregation from other users" (Arrigoni et al., 2017, p. 22). In addition to providing different channels of circulation, comparison, and discovery of place that can transcend across international borders, social networks has the added benefit of supplying a ready-made active audience provided by the platform's existing user community (Arrigoni et al., 2017; Terras, 2011).

Researchers suggest that user engagement is a strong predictor of user satisfaction and postulate that an interface that is designed to facilitate engagement and is highly usable will result in satisfying user experiences (Masrek, Razali, Ramli, & Andromeda, 2018). In an analysis of 20 commonly used design elements that are frequently cited in the literature, the following elements are considered to be the most effective at facilitating user engagement: purpose, graphical representation, and content utility. Purpose is the

establishment of a visible identity that informs users of the purpose of the website so that their expectations for visiting the site are clear. Graphical representation is the inclusion of high-resolution images that do not impact the time it takes to load on screen. Content utility is the delivery of information that is interesting and motivating to the intended user (Garrett, Chiu, Zhang, & Young, 2016). The evidence presented in this section suggests that designing a website that establishes a clear identity, incorporates a sufficient number of visuals, and attracts user interest will result in satisfying user experiences.

Project Design

Informed by best practice conventions, industry standards, and the consideration of archival processes, a historical website prototype was developed (see Figure 1). The website was created in Esri, which is described as a user-friendly, widely accessible web application that easily integrates interactive content for effective storytelling and content delivery, thereby facilitating user engagement (Cope, Mikhailova, Post, Schlautman and Carbajales-Dale, 2018). Additionally, the free program features an intuitive interface, a convenient drag-and-drop method of integrating visuals within the structure of the story, and provides a wide selection of base templates to serve as a helpful starting point.

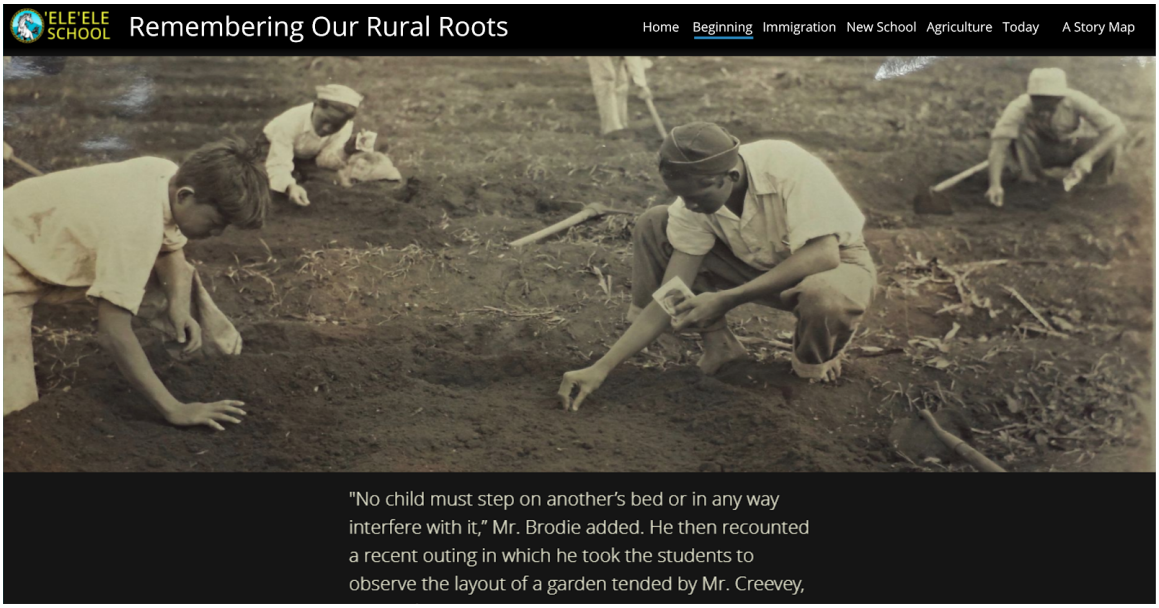

Figure 1. Version 1 prototype of historical website

Prior to developing the prototype, approximately 250 images were digitized during a series of visits to ʻEleʻele School. Because instructions specifically prohibited the archives from being removed, the collection was captured using a digital camera and an iPhone. The dates of the archives ranged from 1920 to the 1990s, but the majority of the collection were from the 1930s. After digitizing the archives, a fraction of the collection was enhanced in Gravit Designer, a free design program with a versatile offering of features that are comparable to other paid design programs. The images were then uploaded into the image-sharing site Flickr, a free, web-based platform for sharing photo

collections (see Figure 2). Founded in 2004, Flickr—which contains many social elements, even if it is not a traditional social media platform—has an active community of 90-million monthly users (Stuart, 2019). The inbuilt features, in particular the metadata tags, maximize the findability of each image because when users search for anything in particular, they are shown similar images displayed alongside one another (Terras, 2015).

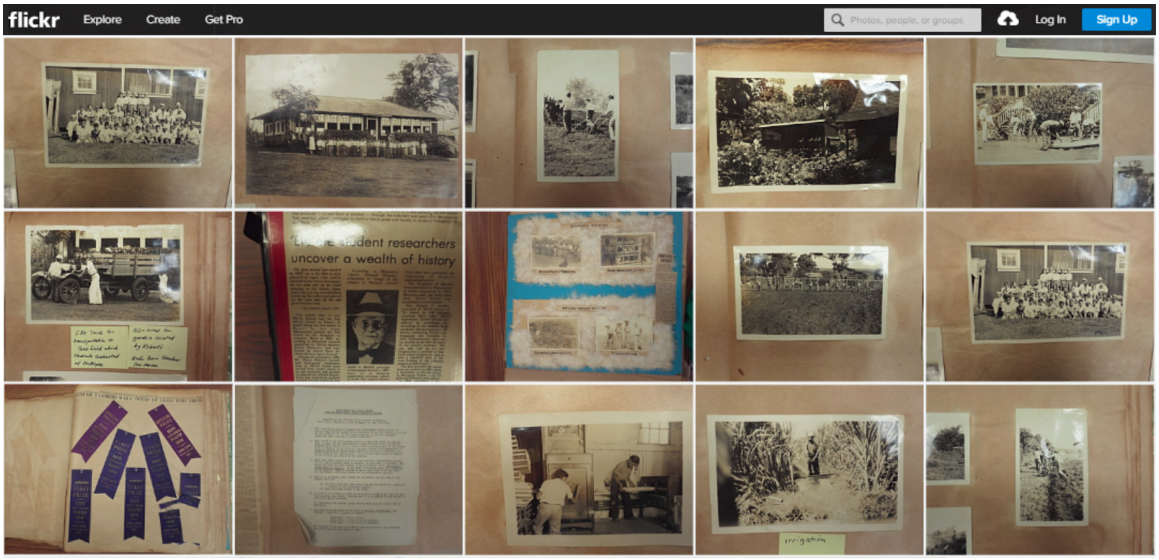

Figure 2. Digital archival repository

Different authors have measured the usability of a website in a variety of ways. Although different metrics coexist, it has been suggested that two important factors are addressed prior to collecting data—identifying what type of evidence is needed to fulfill the purpose of the study and how the information will be used. One of the most well-known usability techniques for improving the quality of a website is by adopting an iterative design and testing approach (Holland & Olmsted-Hawala, 2015). This technique is particularly useful in refining the design of a website based on lessons learned from previous iterations (Friberg, 2016). Researchers suggest that substantial improvements in the overall usability of a site are realized after iterating through at least three versions of the design (Nielsen, 1993). Others have found that combining the iterative approach with the think aloud method, also called active intervention, is especially useful for gathering insights into participants' evolving mental model of a product (Nielsen, 2012).

In a two layer study investigating the relationship between two usability metrics, effectiveness and satisfaction, the researchers found that a reliable and a reasonably strong positive correlation exists between the two, although it was cautioned that the correlations are far from perfect (Kortum & Peres, 2014). This suggests that users are more likely to be satisfied with a website if it is effective in supporting them to successfully achieve their goals.

Effectiveness is defined as the accuracy and completeness with which users can achieve specified goals and does not take into account how such goals are achieved, only the extent to which they are achieved (ISO 9241-11, 2018). Many researchers have utilized the task completion rate to evaluate the effectiveness of a website. This method is particularly useful for collecting objective data and providing a general overview of how much a site supports users and how much improvement is needed (Kortum & Peres, 2014). After each attempted task, the attempt is rated as successful, partially successful, or unsuccessful. However, researchers often caution against rating attempts as partially successful because there is no firm rule for assigning credit for such situations (Nielsen, 2001).

Satisfaction describes a user's subjective response that results from using a website and is thought to be an important correlate of motivation to use the site and, in some cases, may even affect user performance (ISO 9241-11, 2018). A number of techniques have been developed to measure satisfaction. Due to its simplicity, the Single Ease Question (SEQ) is one of the most popular evaluation methods to administer following a task; participants are verbally asked to rate the level of difficulty following each attempted task, with measures ranging from difficult to easy. Interestingly, the SEQ and the task completion rate have shown to be strongly correlated, which means that typically participants' perception of task difficulty ratings provide a reasonable measure of the task completion rating (Sauro, 2018). Another popular method of evaluating the usability of a website is the System Usability Scale questionnaire, which is administered at the end of the test and collects participants' overall perceptions of the usability of the site (Brooke, 1996).

Methodology

Research Questions

This study set out to investigate the following research questions: (1) How effective is the historical website at supporting participants to successfully complete tasks? and (2) How satisfied are participants with the historical website?

Participants

A sample of nine participants were recruited by email (see Appendix A) for this study. Of the nine participants, all (9) participants reported their place of residence in the State of Hawai‘i, seven of whom within the County of Kaua‘i, and all participants (9) indicated having resided there for six years or more. Nearly half of the participants (4) indicated an affiliation with ‘Ele‘ele School, identifying themselves as either a former student or an employee. Of the study sample, a majority of the participants were male (6) and just over half were aged between 30 and 39 (5). Table 1 presents an overview of the participants' self-reported demographic characteristics that were collected for this study.

Table 1. Participant Demographic Characteristics

Characteristics	*N*	%
Gender		
Male	6	66.7
Female	3	33.3
Age		
18–29	–	–
30–39	5	55.6
40–49	1	11.1
50–59	–	–
60+	3	33.3
Marital Status		
Married	5	55.6
Never Married	1	11.1
Divorced	3	33.3
Other	–	–
Residential Status		
Own home	5	55.6
Rent home	1	11.1
Other living arrangements	3	33.3

N=9

Once approval from the Institutional Review Board was secured, the investigator recruited participants by email (see Appendix A) and invited them to complete the background questionnaire (see Appendix B), which was administered in Google Forms. The background questionnaire collected participants' demographic information, internet access and use trends, and self-reported interest in local history. Participants were also sent a consent form (see Appendix C) which outlined the nature of the study and informed them that their verbal responses and screen activity would be recorded. The investigator conducted three iterative rounds of testing individually with each participant from January through February 2019. The moderated remote sessions were facilitated in Zoom, using Zoom's audio- and screen-sharing features, with the investigator and the participant present. Conducting the sessions remotely meant participants were allowed to use their own computers and their preferred internet browsers during the study. Table 2 in Appendix I provides an overview of the computers and web browsers that participants used during testing. Prior to the session, participants were sent the technology set-up checklist (see Appendix D). The total time commitment for participating in the study was one hour, which included reading the facilitator script (see Appendix E), performing a series of tasks, and completing the post-test questionnaire (see Appendix F) that was administered in Google Forms. The raw data was automatically gathered and displayed in Google Sheets.

At the core of participants' self-paced exploration of the historical website were five typical tasks that they were asked to perform. With the exception of the introductory task, the tasks were designed to test key features and potential problematic elements within the site. In all three rounds, the investigator asked the participants to complete the same five

tasks, which prompted them to locate information, navigate to a specific section, visit the photo album, locate information in a video, and view third-party sources. After each task, the investigator asked participants to verbally evaluate the level of difficulty of the last attempted task. After each session, data from the screen- and audio-recording were analyzed and transcribed, an exercise which primarily acted as a memory aid. All usability issues were ranked according to severity, ranging from high-severity issues that prevented participants from completing a task, to low-severity issues that caused minor annoyances (Nielsen, 1995). The purpose of the severity ranking was to prioritize and address the most problematic elements in an efficient manner with respect to time and resource constraints. A timeline of events are presented in Appendix G. Additionally, two CITI Program certificates that verify the completion of required courses are presented in Appendix H.

Results

Beginning with the introductory task, the participants were asked to first view the homepage and to then provide their initial thoughts about the website. In particular, the investigator asked the participants two questions: (1) What do you think is the purpose of this site?, and (2) Who do you think this site is intended for? The introductory task was designed to ascertain whether the homepage establishes a clear purpose and informs participants of what can be expected from visiting the website. After viewing the home page, all participants expressed the word “school.” The majority of participants suggested the site would be about the history of the school based on the image presented in the homepage, as illustrated in Figure 3.

Figure 3. Homepage of historical website

The image displayed on the homepage, which most participants thought looked "old," "historical," and "ancient," was thought to have hinted to users regarding *what* the website was about. Two participants wondered whether ʻEleʻele School is an elementary, middle, or a high school based on the homepage. Furthermore, a closer examination of the title and caption revealed *where* (i.e., ʻEleʻele School in leeward Kauaʻi) and *when* (i.e., for 182 years). Participants presumed the purpose of the website, or *why*, is what they'd expect the content to reveal within the body of the site. Based on the initial reactions from the introductory task, the investigator inferred that website identity is clear and indicative of what users can expect from it.

After viewing the homepage, one participant commented: *"This is a primitive picture ... they don't have shoes. This picture looks really old ... it could be from my great, great grandfather's days. If people go to this site, they can see how it was to go to school back then."* Another participant commented:

> *It seems like it'll be a bit of a history lesson. I see the word roots; I think of the movie and the book. It makes me think it'll be a bit of a history lesson, specifically, people of a certain ancestry. I see the word school here and I think it'll also be about a school.*

Round 1

After averaging the raw usability scores, the results indicate that version 1 of the website had serious usability issues. Both completion rates and satisfaction rates were particularly low. The mean completion rate across all five tasks and all three participants was quite low: 47%. Similarly, the average satisfaction rating was also low: 65%. Perhaps the most significant finding of this round was that all participants struggled to complete tasks due to the large graphics that loaded slowly or failed to load altogether. This significantly prevented most participants from successfully completing tasks, which the investigator rated as a high severity issue and prioritized. Medium-severity issues included the observation as participants struggled to find the link to the Flickr photo album, thus preventing them from seeing the remaining archived images in the collection and subsequently completing the task.

Finding 1.1: Locating task-specific information was significantly hindered due to graphics that loaded slowly or failed to load altogether. Most of the graphics were 4,000 pixels wide at 300 dpi, which imposed many challenges during testing. This was a recurrent theme in all rounds of testing, but was especially apparent in Round 1. This effectively impacted the performance of several participants, hindering—and in some cases even preventing—their ability to complete tasks. As illustrated in Figure 4 below, most of the graphics that participants viewed in this round were in the process of loading; however in some rare but unusual cases, one or two graphics failed to load altogether and displayed an error message instead.

During this round, a participant commented: *"So, I'm looking for the video. I am anxious to get to it. The images are loading … I'm wondering if that is going to be it."* After observing 100% of participants (n=3) encountering problems due to the graphics, the investigator rated this issue as a high-severity issue and made it a priority to fix. Due to time constraints and the number of graphics featured in the site, the investigator reduced the graphic sizes from a width of 4,000 pixels to 2,000 pixels, as time allowed. The graphics were revised after testing with each participant, as opposed to testing after each round. Apart from this instance, all other issues were revised and addressed at the end of each round.

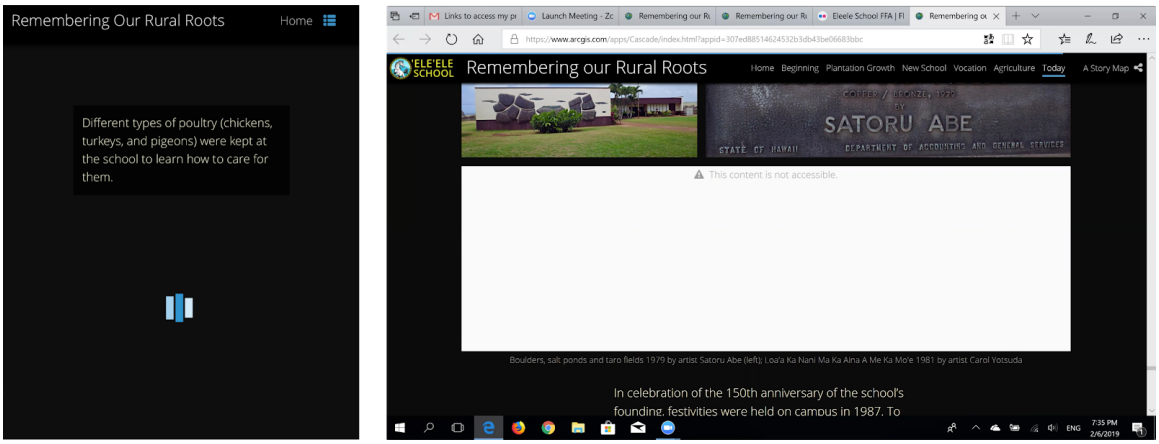

Figure 4. Screenshot of graphics that loaded slowly (left) and failed to load

Finding 1.2: The menu link was redundant. At the top (where the navigation functions are located), participants were presented with the school's logo, the navigation links, and the generic 'A Story Map' (see Figure 5) that can be found on, and also removed from, all Esri Story Maps. Some participants clicked on 'A Story Map' and were "disappointed" to be returned to the home page of the historical site. One participant expressed: *"I'd remove 'A Story Map'. It reminds me of sitemap that's on most pages. When I clicked on 'A Story Map' I was disappointed because I thought it'd take me somewhere else … not back."*

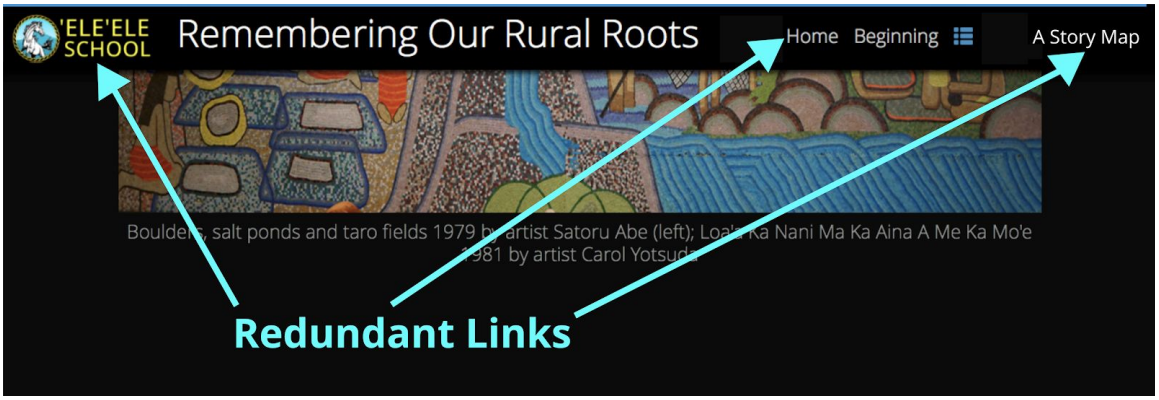

Figure 5. Menu links were redundant in version 1

Some participants said that they were expecting to be taken to another page, while others said it was "redundant" to have multiple ways of navigating to the same page in the menu header. Another participant said: *"I don't think 'A Story Map' belongs there because when I click on it, it takes me back to the site. You already have 'Home' and it takes you there, too. To me, it's kinda redundant."*

Finding 1.3: The link to the external Photo Album was hard to find. The investigator observed participants struggling to find the photo album link and inferred that the inconspicuous placement of the link—in the footer at the bottom of the website—had prevented the participants from finding the album and completing the task successfully. To address this issue, the investigator added a link in the descriptive caption below each image that, when clicked, would navigate to the external Flickr photo album. From there, the investigator hoped that participants would view and browse through the remaining photos in the album to complete the task.

One participant suggested the following: *"If you want people to view the photo album, you should add it to the menu, so it's apparent."* Based on the suggestion, the investigator revised the menu after Round 2 (see Figure 6) which significantly improved participants' ability in the subsequent rounds and aided their ability to complete the task at hand.

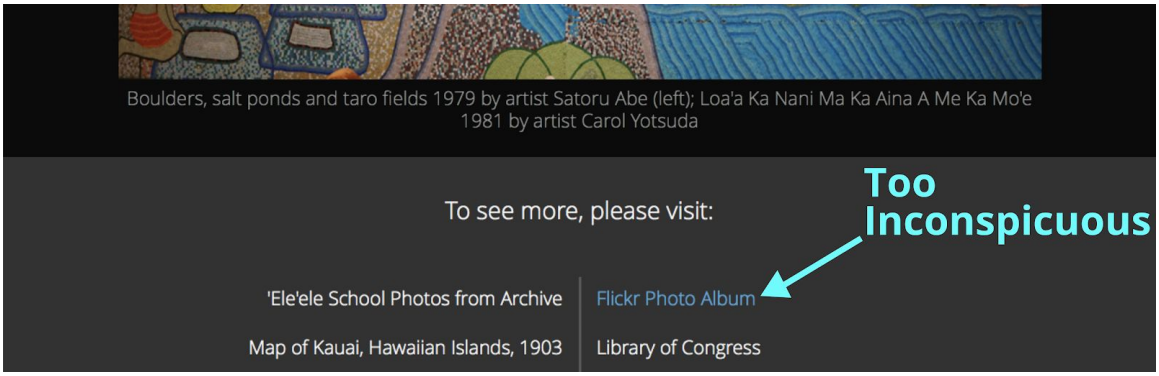

Figure 6. Inconspicuous placement of Flickr photo album link in version 1 prototype

Further adjustments were made to version 2 (Figure 7) and version 3 (Figure 8). This significantly helped participants to find the link to the album and successfully complete the task.

Figure 7. Added text that linked to Flickr photo album in the menu of version 2

Figure 8. Replaced the text with the Flickr logo in version 3

Finding 1.4: Heavy use of text. Based on the investigator's observations, participants in Round 1 spent a significantly longer time attempting to find task-related information in comparison to participants completing the same task in subsequent rounds. However, it is important to note that time on task was not collected during this study. The objective of the task was to assess the text density, or the number of words and meaningful information presented in the text. While attempting the task, one participant commented: *"There's a lot of information … Not something I can scan in a couple of minutes."* Revisions were made by reducing the text and clarifying the ideas in each sentence.

Round 2

In Round 2, there was a noticeable improvement in the mean completion rate (80%) which shows a 33% increase from the previous round. Similarly, the average post-task satisfaction rating improved (82%) which is an increase of 17.3% from the first round. Interestingly, there is a 2% difference between both effectiveness and satisfaction metrics. This suggests that a strong correlation between performance and preference measures exists. It is worth noting that all participants successfully completed three out of five tasks in this round. Round 2 experienced a few medium-severity issues , which were caused by the inconsistent use of captions that prevented some participants from visiting the Flickr album and subsequently completing the task. Minor issues included grammatical errors and formatting issues.

Finding 2.1: Participants stated that the image captions were inconsistent. Several participants were confused by the lack of visual and informational consistency, while noting that the language used to describe images and the color of the text (see Figure 9) were often inconsistent throughout the website.

Figure 9. Inconsistent captions caused confusion and hyperlinked captions (shown here) were hard to see

Participants noticed a general inconsistency with all descriptive captions, some calling it "illogically organized" and "lack of pattern" stating that some captions were explanatory, some were just dates, several were missing, some captions were grey, and others were blue. During their exploration, several participants recognized the blue captions were hyperlinks but noted how difficult it was to see that particular color in comparison to the grey captions that they thought were easier to read. This inhibited the participants' ability to scan the captions for needed information, often stopping to get a better view, but more often than not, resulting in impatience and giving up. Participants suggested removing the links from the captions and adding it to the larger text within the narrative. Other suggestions included maintaining a unified look by sticking to one color and clarifying the language to maintain consistency.

Finding 2.2: The distinction between the different locations on the map were unclear to the participants that were unfamiliar with the island of Kauaʻi. The investigator observed participants struggling to connect the narrative with the locations on the map. This presented a barrier to participants' ability to identify the relevance of the narrative in relation to the map, comprehend its content, and locate the task-specific information. A suggestion was made to identify the locations on the map itself or within the narrative to familiarize users who are unfamiliar with the island of Kauaʻi.

Round 3

There was a slight improvement in both Round 3 scores. The mean completion rate (93.3%) and the average post-task satisfaction rate (90.7%) increased slightly from the previous rounds.

Finding 3.1: Color of quotes was difficult to read. Most participants found the quotes easy to read. However, one participant who self-identified as "red-green color blind" had difficulty reading the quotes due to an insufficient contrast between the foreground text color and the background color. To remedy the issue, the quotes were italicized to alter its appearance in a pronounced way that is distinctive from the color and narrative of the main text that surrounds it.

Finding 3.2: Sections of website were confusing. The second task asked participants to navigate to a specific part of the website, which all participants (N=9) completed successfully. However, some participants expressed confusion because the section headers were not readily apparent, making it necessary to slow down in order to browse through the site and locate information. Some participants thought the headers appeared "buried" or "hidden" in between the text and graphics.

Discussion

Several reports have shown that adopting an iterative design and testing approach is particularly effective for improving the design of a website. This study set out with the goal of improving the website with each successive round of testing. By repeating the

same tasks across iterations, the investigator was able to evaluate whether continual improvements were made by comparing the scores from each iteration. As demonstrated by the mean completion and mean satisfaction ratings from each round, big improvements were realized through redesign iterations. The results of this study suggest that conducting multiple iterations of testing and revising is a useful and effective procedure for finding and fixing usability issues.

Conclusion

The results from this study further support the idea that collecting qualitative and quantitative metrics are invaluable for assessing and improving the quality of a website. With respect to the research questions, findings from this study indicate that a strong positive correlation exists between measurements of effectiveness and satisfaction, which is in line with those of previous studies. Based on the task completion rate following the third iteration, the website was effective in supporting the majority (93%) of participants to complete tasks. The majority (78%) of participants agreed that the website was easy to use, half of whom (56%) strongly agreed. Similarly, the majority (89%) of participants indicated an overall satisfaction with the historical website.

However, a note of caution is due here. The findings from this study may be somewhat limited due to the small study sample and the participants' self-reported satisfaction scores. This study has raised important considerations regarding the investigator's decision to include partially successful completion scores. Other researchers have cautioned against it and have instead opted to rate each attempted task with the standard pass or fail score. This was a significant implication that needed to be considered during this study. For example, a particular task asked participants to find specific information in an embedded video within the website. The information was presented eight seconds into the video, but the participants were not informed of this during testing. But when the participants pressed play, it was immediately apparent that the blaring music alarmed the participants, which caused the majority of them to instinctively hit pause thereby missing the information presented at the 8 second mark. The investigator consistently issued this as a partially successful attempt because initially, participants were on the right path. In hindsight, issuing partial attempts have potentially contaminated the objective statistics based on the investigator's inference. Further research would be beneficial to establish a systematic and objective method of analysing and issuing partially successful task attempts that can be generalized and adapted for a wide range of research fields.

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Appendix A: Invitation to Participate

SUBJECT LINE: I invite you to participate in my usability study

Aloha e [PARTICIPANT]:

Do you live in Hawaii? Do you own a computer with a reliable internet connection? If you answered YES to both, then I, Kerri Muraoka, would like to invite you to participate in a usability study that will be conducted completely online using a computer.

The purpose of this study is to evaluate the ease-of-use of a historical tour website. I will ask you to do some typical tasks while using the website and to give your feedback afterwards. This usability study is very important to me because it will provide me with feedback that will help to improve my website. It will also help me to fulfill a requirement to earn my Master's degree in the Learning, Design, and Technology program at the University of Hawai'i at Manoa. I am attaching a consent form that will provide you with detailed information.

If you agree to participate, please click on the link and complete the consent form by [DATE].

To access the form: [LINK]

If you have any questions regarding my study, please feel free to contact me at any time.

Thanks very much, [PARTICIPANT]. I look forward to your response.

Mahalo,
Kerri

Appendix B: Background Questionnaire

Background Questionnaire

The purpose of this questionnaire is to help me to better understand your background and to interpret your feedback to improve my project.

There are 10 questions and should take no longer than 15 minutes to complete. Thank you!

* Required

1. **Email address** *

_____

2. **Your name will be kept confidential. The information that you provide will only be used for the purpose of this study. By choosing "agree" below, you confirm that your information is correct and that you agree to let your information be used for this study.** *

Mark only one oval.

- ◯ Agree
- ◯ Disagree (stop filling out this form)

3. **Which of the following ranges best describes your age? (Select one.)** *

Mark only one oval.

- ◯ Under 17 years old
- ◯ 18–29 years old
- ◯ 30–39 years old
- ◯ 40–49 years old
- ◯ 50–59 years old
- ◯ 60 years or older

4. **What is your gender? (Select one.)** *

Mark only one oval.

- ◯ Male
- ◯ Female
- ◯ I prefer not to respond.

5. **What is your present marital status? (Select one.)** *

Mark only one oval.

- ◯ Married
- ◯ Never married
- ◯ Divorced
- ◯ Separated
- ◯ Widowed

6. **What is your current residential status? (Select one.)** *
Mark only one oval.

- ◯ Own home
- ◯ Rent home
- ◯ Other living arrangements
- ◯ I prefer not to respond.

7. **Please indicate the length of time you have lived in Hawai'i. (Select one.)** *
Mark only one oval.

- ◯ Less than 12 months
- ◯ 1 to 2 years
- ◯ 3 to 4 years
- ◯ 5 to 6 years
- ◯ More than 6 years
- ◯ I do not live in Hawai'i.

8. **Please indicate the length of time you spend on the Internet each week. (Select one.)** *
Mark only one oval.

- ◯ Fewer than 2 hours per week
- ◯ Between 2 and 5 hours per week
- ◯ More than 5 hours per week

9. **In the past year, how often have you performed the following Internet-related tasks:** *
Mark only one oval per row.

	Never	Once or twice	Monthly	Weekly	Daily
Looking up information using a search engine	◯	◯	◯	◯	◯
Reading the news	◯	◯	◯	◯	◯
Entertaining (e.g., watching videos, listening to music, playing games)	◯	◯	◯	◯	◯
Responding to online discussion forums or blogs	◯	◯	◯	◯	◯
Keeping in touch with friends and family on social networking sites (e.g., Facebook)	◯	◯	◯	◯	◯
Getting directions	◯	◯	◯	◯	◯

10. **Please indicate your level of agreement or disagreement with each of the following statements:** *

Mark only one oval per row.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I enjoy learning about local history.	◯	◯	◯	◯	◯
I find local history interesting.	◯	◯	◯	◯	◯
As far as I am concerned, there are better places to be than Hawaii.	◯	◯	◯	◯	◯
I feel that I can really be myself in Hawaii.	◯	◯	◯	◯	◯
Hawaii reflects the type of person I am.	◯	◯	◯	◯	◯

Thank you for completing the questionnaire. I will reach out to you with more information by the end of the week.

☐ Send me a copy of my responses.

Appendix C: Consent Form

Remembering Our Rural Roots: A Usability Study

Before you decide to participate, it is important that you understand why the study is being done and what it will involve. Please read the following information carefully and answer the questions below. Thank you.

Aloha! My name is Kerri Muraoka and I am a graduate student at the University of Hawai‘i at Mānoa. I am conducting this research project to fulfill a requirement to earn my Master’s degree in the Learning, Design, and Technology program. The purpose of my project is to evaluate the ease-of-use of a historical tour website. I am asking you to participate because you are an adult and currently living in Hawai‘i.

Activities and Time Commitment
Participating in the study will involve performing several tasks, answering several follow-up questions, and completing a survey. Some of the tasks that you will be asked to perform includes finding information and clicking on links. The follow-up questions will include questions like, “If you could change one thing about the website, what would it be?” The study will be completely online using a computer with internet access. Only you and I will be present during the study. With your permission, I will audio- and screen-record the session. Please note that your face will not be recorded, just your computer screen and your voice. After the recording, I will analyze your feedback to improve my website for future use. The total session will take up to one hour of your time. Your participation in this project is completely voluntary. You may stop participating at any time. If you stop being in the study, there will be no penalty or loss to you.

Risks and Benefits
Your participation will help me to determine the effectiveness of the historical website. There is little risk to you for participating in this research study. There is no direct benefit to you for participating in this research study. The results of this study may help to improve my historical website for future use. You will not receive any payment or compensation for your participation in this research study.

Privacy and Confidentiality
Any information that is obtained in this research study will remain confidential. I will keep all study data encrypted on a password protected computer. Only my University of Hawai‘i advisor and I will have access to the information. Other agencies that have legal permission have the right to review research records. The University of Hawai‘i Human Studies Program has the right to review research records for this study. After I write a copy of the interviews, I will erase or destroy the audio-recordings. When I report the results of my research project, I will not use your name. I will not use any other personal identifying information that can identify you. I will use pseudonyms (fake names) and report my findings in a way that protects your privacy and confidentiality to the extent

allowed by law. Even after removing identifiers, the data from this study will not be used or distributed for future research studies.

Questions

If you have any questions about this study, please email me at kerrihm@hawaii.edu or call me at 808.###.####. You may also contact my advisor, Dr. Grace Lin, at gracelin@hawaii.edu. You may contact the UH Human Studies Program at 808.956.5007 or uhirb@hawaii.edu. to discuss problems, concerns and questions; obtain information; or offer input with an informed individual who is unaffiliated with the specific research protocol. Please visit http://go.hawaii.edu/jRd for more information on your rights as a research participant.

Participation

I read and understand the above information and agree to participate in this usability study. I understand that I can change my mind about being in the project at any time by notifying the researcher.

Audio and Screen Recording

I understand that my verbal responses and screen activity will be recorded as I participate in this usability study.

Please enter today's date: [Month, day, year]

Please enter your name: [First and last name]

By submitting this form, you consent to participate in the study AND to have the session audio- and screen-recorded. Please print or save a copy of this page for your reference. Mahalo!

Appendix D: Technology Set-Up Checklist

Facilitator Set-Up Checklist

1. Facilitator connects computer to a power outlet (don't trust the battery).
2. Make sure a strong Internet connection is established.
3. Set up audio and test:
    - Ensure the microphone is working
    - Ensure the volume is at a reasonable level
4. Login in to Zoom account
5. Contact participant and ask if participant's computer is set up and if they are ready.

Participant Set-Up Checklist

1. Participant sets up his/her computer and connects to a power outlet (don't trust the battery).
2. Make sure a strong Internet connection is established.
3. When contacted, Participant should login to Zoom by clicking on the link and following the instructions provided by the Facilitator [emailed to the Participant prior to the test date]
4. Set up audio and test:
    a. Ensure the microphone is working
    b. Ensure the volume is at a reasonable level

After Participant's computer is set up:

5. Facilitator invites participant to Zoom meeting room.
6. How to test if Zoom is working:
    a. Start a meeting by clicking on 'host a meeting' on top right of the account page next to your name.
    b. At the scheduled time when both parties are ready to participate in the study, notify the Participant to click on link [emailed prior to the test date] to join Zoom meeting.
7. Run an audio and screen-share test with Zoom account
    a. If it does not work, review preparation of Facilitator's computer for Zoom and retest
8. In the chat box in Zoom, the Facilitator will post the URL of the website
9. Wait until both parties are ready and then begin recording.

Appendix E: Facilitator Script

Hi, [PARTICIPANT]. My name is Kerri and I'm going to be walking you through this session today.

Before we begin, I have some information for you, and I'm going to read it to make sure that I cover everything.

The purpose for today's session is to test out a website that I've created. As you use the website, I'm going to ask you as much as possible to try to think out loud: to say what you're looking at, what you're trying to do, and what you're thinking. This will be a big help to me. Please remember that we are testing the *website* and not you. You can't do anything wrong here, so don't worry about making any mistakes. Also, please don't worry that you're going to hurt my feelings. I'm doing this to improve the site, so it'd be helpful to get your honest reactions.

Today's session should take no longer than one hour.

Also, if you have any questions as I go along, just ask them. I may not be able to answer them right away, since I'm interested in how people do when they don't have someone who can help. But if you have any questions when we're done, I'll try to answer them then. Any questions so far?

In the chat box, I am posting a link to the instructions on how to share your screen with me. If you've ever done this before, just disregard the link and go ahead and start sharing your screen with me. I'll then walk you through the next step.

Great! Now I can see your computer screen. Shall I start the screen recorder now?

In the chat box, I am posting the link to the website that we'll be testing today. Please click on the link.

I've posted the link to our post-test questionnaire in the chatbox. Please take a few moments to click on the link and answer the questions.
I just want to say thank you very much for your time today. If you have any questions about the study moving forward, please don't hesitate to email me. If you don't have any more questions right now, I'm going to go ahead and conclude our research today.

Thank you!

Stop the Zoom recording by clicking on the button labeled, "end recording."

Appendix F: Post-Test Questionnaire

Post-Test Questionnaire

There are 9 questions and should take no longer than 15 minutes to complete. Thank you!

* Required

1. **Email address** *

_____

2. **Please indicate your level of agreement or disagreement with each of the following statements:** *

Mark only one oval per row.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I thought the historical tour was easy to use.	◯	◯	◯	◯	◯
I found the various functions in the historical tour were well integrated.	◯	◯	◯	◯	◯
I thought there was too much inconsistency in the historical tour.	◯	◯	◯	◯	◯
I felt very confident navigating through the historical tour.	◯	◯	◯	◯	◯
I needed to learn a lot of things before I could get going with viewing the historical tour.	◯	◯	◯	◯	◯

3. **Please indicate your level of agreement or disagreement with each of the following statements:** *

Mark only one oval per row.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
It was easy to find the information that I was looking for.	◯	◯	◯	◯	◯
I thought it was easy to find my way back after clicking on the links.	◯	◯	◯	◯	◯
The historical tour had all the functions and capabilities I expected it to have.	◯	◯	◯	◯	◯
Overall, I am satisfied with the historical tour.	◯	◯	◯	◯	◯

Powered by Google Forms

Appendix G: Projected Timeline

Date	Task
October	Begin writing detailed project plan. Begin the IRB approval process. Develop prototype. Develop usability material (set-up checklist, protocol, facilitator script, task scenarios, post-test interview) Develop data collection tools (background questionnaire, post-test questionnaire, record logs); consent form and email invitation
November	Continue drafting and revising project plan and prototype Review and solicit feedback from peers
December	Finalize project plans for approval
January	Upon IRB approval begin project implementation. Collect background questionnaire data Conduct first iteration of usability testing with 3 users Identify, prioritize, and address critical usability issues
February	Continue implementing project Continue collecting background questionnaire data Conduct second iteration of usability testing with 3 users Identify, prioritize, and address critical usability issues
March	Conduct third iteration of usability testing with 3 users Identify, prioritize, and address critical usability issues Analyze and interpret final data Complete final paper draft
April	Create TCC Presentation Slides Conduct TCC Presentation
May	Complete final paper

Appendix H: CITI Certificates

CITI PROGRAM

Completion Date 24-Feb-2018
Expiration Date 23-Feb-2021
Record ID 26309710

This is to certify that:

Kerri Muraoka

Has completed the following CITI Program course:

Human Subjects Research (HSR) (Curriculum Group)
Exempt Researchers and Key Personnel (Course Learner Group)
1 - Basic Course (Stage)

Under requirements set by:

University of Hawaii

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?wdb299433-ac0f-4ec2-b3df-61a0c86e92fe-26309710

CITI PROGRAM

Completion Date 25-Feb-2018
Expiration Date 24-Feb-2021
Record ID 26315117

This is to certify that:

Kerri Muraoka

Has completed the following CITI Program course:

Information Privacy Security (IPS) (Curriculum Group)
Exempt Researchers and Key Personnel IPS (Course Learner Group)
1 - Basic Course (Stage)

Under requirements set by:

University of Hawaii

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?wfef188b2-7a8b-4960-8f08-c6865655befd-26315117

Appendix I: Participants' Computers and Web Browsers

Table 2. Overview of Participants' Computers and Web Browsers

Characteristic	*N*	%
Computer		
Laptop	5	55.6
Desktop	4	44.4
Other	–	–
Operating System		
Windows	7	77.8
Mac	2	22.2
Other	–	–
Web Browser		
Chrome	5	55.6
Safari	2	22.2
Firefox	1	11.1
Microsoft Edge	1	11.1
Other	–	–

N=9